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CANADIAN INTELLECTUAL
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(11) (C) 2,087,600

(86) 1992/05/22

(43) 1992/11/30

(45) 1997/03/18

(51) Int.Cl. ⁶ A61K 35/78

(19) (CA) **CANADIAN PATENT** (12)

(54) Antineoplastic Chemotherapeutic of Plant Origin, Having
High Selectivity and Greatly Reduced Toxicity, and
Process for the Preparation Thereof

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(30) (IT) Italy RM91A000372 1991/05/29

(57) 38 Claims

NO DRAWING



Industrie
Canada

Industry
Canada

OPIC - CIPO 101

Canada

PCT

18 MARS 1997

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 : A61K 35/78	A1	(11) International Publication Number: WO 92/21359 (43) International Publication Date: 10 December 1992 (10.12.92)
(21) International Application Number: PCT/IT92/00057 (22) International Filing Date: 22 May 1992 (22.05.92) (30) Priority data: RM91A000372 29 May 1991 (29.05.91) IT (71)(72) Applicant and Inventor: D'ARRIGO, Claudio (IT/IT); Via Elea, 2, I-00183 Roma (IT). (74) Agents: DI CERBO, Mario et al.; Società Italiana Brevetti S.p.A., Piazza di Pietra, 39, I-00186 Roma (IT). (81) Designated States: AT (European patent), AU, BE (European patent), BG, BR, CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GB (European patent), GR (European patent), HU, IT (European patent), JP, KR, LU (European patent), MC (European patent), NL (European patent), NO, PL, RO, RU, SE (European patent), US.	2087600 Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.	
(54) Title: ANTINEOPLASTIC CHEMOTHERAPEUTIC OF PLANT ORIGIN, HAVING HIGH SELECTIVITY AND GREATLY REDUCED TOXICITY, AND PROCESS FOR THE PREPARATION THEREOF		
(57) Abstract <p>The invention relates to active principles having an antineoplastic action, extracted from plants of the family Pittosporaceae, and to pharmaceutical preparations based on at least one of the substances or compositions to be found in said extracts. With respect to other known antitumoral drugs, these antineoplastic chemotherapeutic drugs show greater selectivity towards degenerated cells and a lower level of interference with the metabolism of healthy cells. The invention also extends to the process for extraction and separation of the components of the extracts and to their use for the preparation of antineoplastic drugs or drugs for the treatment of other pathologies.</p>		

TITLE

ANTINEOPLASTIC CHEMOTHERAPEUTIC OF PLANT ORIGIN, HAVING
HIGH SELECTIVITY AND GREATLY REDUCED TOXICITY, AND
PROCESS FOR THE PREPARATION THEREOF

DESCRIPTION

The present invention has as its subject
substances and compositions having an antineoplastic
activity, extracted from plants of the family
Pittosporaceae, pharmaceutical preparations based on at
least one of said substances and compositions, and
processes for the extraction and, respectively,
formulation thereof.

As it is known, one of the most promising lines of
research which, at least from a theoretical point of
view, is of easy application in research aimed at
eliminating neoplastic diseases, is that of antitumoral
chemotherapy. The antiproliferating agents which have
been isolated up to the present time are of widely
differing origins and heterogeneous chemical
characteristics. Among these antiproliferating agents
are also certain substances extracted from plants such
as colchicine and vincalcucoblastin, the former
extracted from Colchicum Autumnale and the latter from
Vinca Rosea. Although these antiproliferating
substances are more or less provided with a certain
specifically antitumoral activity, their selectivity
towards degenerated cells is generally rather poor. The
danger deriving from the possibility of their
interfering with the metabolism of healthy cells thus
forms an important obstacle to their wider use.

It has now been surprisingly found that the
present invention makes it possible to overcome the
above mentioned limitations, providing a
chemotherapeutic antineoplastic agent based on active
principles of plant origin and provided with highly
selective antitumoral activity and a toxicity level
much lower than that of other antitumoral drugs.



First of all, the subject matter of the present invention is a process for obtaining substances and/or compositions having an antineoplastic activity, characterized by the fact that parts and/or products of plants from the family Pittosporaceae - in whatever stage of their development or maturity - are made to undergo essentially the following operations:

- a) extraction of components by maceration in an organic solvent;
- b) optional stirring or shaking of the solution containing the extract with another solvent, at least partially miscible with the first, to distribute the components of the extract among the phases formed;
- c) optional treatment of each phase, independently from each other, with at least one further organic liquid having the properties of solvent for at least one of the components in the extract, followed by filtering of any suspension which may have formed and collection of the solid phase and its successive purification;
- d) optional separation of the components found in each liquid phase; and
- e) collection of the separated components with antineoplastic activity and those without antineoplastic activity.

The extracts can be dried and purified before each further stage of the process.

The plants of the family Pittosporaceae are preferably of the genus Pittosporum. In this sense, the plants can be selected, for example, from the group comprising Pittosporum undulatum, Pittosporum coriaceum, Pittosporum viridicolor, Pittosporum rhombipholium, Pittosporum eugenoides, Pittosporum crossifolium and Pittosporum Tobira and combinations thereof.

The solvent can be an alcohol. Good results have

been obtained using ethyl alcohol.

The volume ratio between organic solvent and plant parts to be treated is preferably comprised between 1:10 and 10:1.

5 The treatment times are preferably comprised between 5 minutes and 3 months. The treatment temperatures can vary preferably between 5°C and 100°C.

10 Separation of the components from the extract can be preferably of the chromatographic type. Good results have been obtained using chromatography on a silica gel column or on an HPLC preparatory column.

15 Extraction can be performed using ethanol and collecting the components which have retention times in HPLC around the values 1.157, 1.545, 1.883, 2.051, 2.273, 2.572 and 2.743.

20 (It must be specified that the analytic tests in HPLC, both in this case and in the following ones, were carried out using a Perkin-Elmer series 250 chromatograph with a 125 mm*4 mm RP 18 column with a mobile phase consisting of methanol-H₂O (80:20) and a wave length equal to 210 nm).

25 After extraction with ethanol, the solution thus obtained can be shaken with chloroform forming two phases, an alcohol-chloroform phase of an intense green colour and an aqueous phase of an orange-yellow colour. In this case the components having an antineoplastic activity are found in the alcohol-chloroform phase. Collection of the components having antineoplastic activity is performed chromatographically after having
30 dried out the alcohol-chloroform phase and having resolubilized the solute in methanol. Performing chromatography on the methanolic solution using the HPLC technique, the components having retention times around the values 1.969, 2.296 and 2.756 are collected.

35 The alcohol-chloroform solution can be concentrated by evaporation and isopropyl alcohol can be added to form a suspension that is filtered, the

5 solid phase having been heat dried and powdered in a mortar. After being resolubilized in ethanol-water it can then be purified on a chromatographic column of active carbon. The two solid fractions (impure and pure) dissolved in ethanol-water or in methanol can be chromatographed using the HPLC technique, collecting the components with retention times around the values 1.157, 1.545 and 2.264.

10 The invention also refers to substances and compositions per se, characterized by the fact that they are obtainable using the process described above.

The subject matter of the present invention are also substances and compositions having an antineoplastic activity, characterised by the fact that 15 they are obtainable using the process mentioned above.

The substances and compositions having an antineoplastic activity can be treated to form salts, compounds or complexes, in order to make them water soluble.

20 The present invention further comprises a pharmaceutical preparation, characterized by the fact that it contains as at least one of its active principles a substance or composition selected from the group of substances or compositions having an antineoplastic activity which are obtainable from the 25 process described above, or combinations thereof.

The pharmaceutical preparation can be selected from the group comprising aqueous solution for parenteral use, capsules for oral use, suppositories for rectal use, ovules for use in the vagina, unguents, 30 salves, cremes and gels.

The aqueous solution can be in phials. Each phial contains between 0.1 and 2.5 g of active principle, preferably between 0.1 and 1.5 g, more preferably 35 between 0.2 and 1.0 g of active principle.

In the case of a pharmaceutical preparation in the form of a capsule, each capsule contains 0.2-2.0 g of

active principle, preferably 0.8-1.2 g of active principle.

5 In the case of a pharmaceutical preparation in the form of a suppository for rectal use, each suppository contains between 0.2 and 2.5 g of active principle, preferably between 0.3 and 1.0 g or between 1.2 and 1.7 g of active principle.

10 In the case of a pharmaceutical preparation in the form of an ovule for use in the vagina, each ovule contains between 0.1 and 2.5 g of active principle, preferably between 0.5 and 2.5 g, more preferably between 0.3 and 1.7 g of active principle.

15 In the case of a pharmaceutical preparation in the form of an unguent, a salve, a creme or a gel, the local excipient contains between 0.5 and 12% of active principle, preferably between 3 and 7% of active principle.

20 The invention further refers to the use of the components obtainable using the extraction, separation and collection process given above, either alone or in combination, for the preparation of drugs for the treatment of various pathologies other than neoplastic ones.

25 Up to now the objects of the present invention have been described in a general manner. With the aid of the following examples, a more detailed description will now be given to clarify the extent, characteristics, advantages and operating methods of the invention.

30 EXAMPLE 1

Method for the extraction and purification of the active principles

35 1 kg of unripe fruits of the *Pittosporum Tobira* were finely ground and infused at room temperature with a quantity of ethyl alcohol at 95° sufficient to cover the ground fruits (approximately 1:1 by volume). The mixture is left to steep for at least 30 days, then

5 filtered. The 1000 ml of alcoholic extract, obtained as described above, are put into a separating funnel together with the same volume of chloroform. After stirring a number of times, separation occurs, which is completed after 24 hours of mixing: in the lower part of the funnel an alcohol-chloroform solution of an intense green colour is separated off; in the upper part of the funnel an aqueous solution of a yellow-orange colour (orange soluble fraction = OSF), formed by the hydrosoluble substances extracted from the water initially present in the fruit. OSF is present in an amount of approximately 20% by volume and is formed almost exclusively of components which have an RT in HPLC of 1.141 (3.45% area), 1.440 (24.46% area) and 1.593 (61.93% area). The OSF substance, equal to approximately 73% by weight of the dry substance of the total alcoholic extract, is formed by a yellowy-white powder which not only is completely inactive on experimental tumours, but actually aids their evolution, causing it to become more rapid. This substance is therefore removed. The residual alcohol-chloroform solution is evaporated at 30°C in a rotavapor and dried out. An amorphous substance is obtained, dark green in colour, which, once it has been resolubilized in methanol (1 mg/ml) and analyzed using HPLC, shows a notable concentration of active peaks with retention times ranging from 1.969 (7.83% area) to 2.296 (40.12% area) to 2.756 (1.47% area).

EXAMPLE 2

Method for purification of the active principles

The alcohol-chloroform solution left over from the operations performed in example 1 (made up of total alcoholic extract less OSF), is evaporated in a flask in a rotavapor at 45°C until concentrated to a volume of approximately 30 ml (approximately 1/35 of the total starting alcoholic extract). At this point, a quantity of isopropyl alcohol equal to 30% of the total

initial alcoholic extract (300 ml) is added to the flask. A suspension is formed, as a part of the substances obtained in the total alcoholic extract less OSF, which was soluble both in ethanol and in methanol, is no longer soluble in isopropanol.

The suspension thus obtained is set to filter on rapid filter paper. The precipitate which is deposited on the paper is heat dried at a temperature of 45°C. Once dry, it is finely ground in a porcelain mortar. Approximately 1500 mg of a yellow-greenish powder are thus obtained. This powder (which hereinafter will be referred to as CIDI), solubilized in methanol and examined using the usual HPLC method, shows RTs of 1.157 (78.83% area), 1.545 (16.25% area) and 2.264 (4.91% area).

Alternatively, using a Supelcosil* LC-NH₂-5/ μ -spherical column, mobile phase CH₃CN-H₂O (3:1) for a flow rate of 1.5 ml/m and an UV detector at 217 nm, the following RT values were obtained: 1.889 (concentration 53.88); 2.640 (20.89); 3.145 (4.61); 3.420 (5.08); 3.942 (6.16); 4.722 (4.53); 5.255 (3.253); 6.287 (0.90) and 6.982 (0.66).

On a Chromopack-Lichrosorb* RP 18-10 μ -irregular column, with the same eluent, flow and marker, the following peaks were obtained: 1.460 (concentration 65.98); 1.965 (20.87); 2.535 (1.86); 2.704 (2.05); 3.097 (1.74); 3.395 (3.38); 4.324 (0.85); 4.609 (0.93); 9.597 (0.88); 10.017 (1.42).

The substance CIDI presents a 3.17% residue on calcination. The elementary analysis in % by weight (without taking the residue into account) is the following: C 54.25%; H 7.58%; O 38.17% with a minimal empirical formula close to C₁₅H₂₅O₈ and m.p. (dec.) 196-222°C. The IR spectrum (IR spectrophotometer Perkin-Elmer Mod. 683) in KBr medium, concentration 1 mg/100 mg, shows the following observable bands:

3400 cm⁻¹ stretching OH associated; 2960 cm⁻¹

* Trade-mark

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asymmetrical stretching CH_3 ; 2920 cm^{-1} asymmetrical stretching CH_2 ; 1720 cm^{-1} stretching C=O ; 1610 cm^{-1} asymmetrical stretching C=O of COO^- ; 1460 cm^{-1} bending CH_3 ; 1380 cm^{-1} bending CH_3 (typical of OCOCH_3); 1250 cm^{-1} bending OH ; 1150 , 1080 and 1040 cm^{-1} stretching C-O .

UV spectrum (spectrophotometer UV-vis Perkin-Elmer mod. Lambda 5):

1) Solution in $\text{CH}_3\text{OH-H}_2\text{O}$ (4:1), concentration $6 \cdot 10^{-2}$ mg/ml:

maximum absorption at 202 nm ; absorption quickly decreases up to 260 nm , remains constant in the range $260-330\text{ nm}$, and then decreases again;

2) Solution in $\text{CH}_3\text{CN-H}_2\text{O}$ (3:1), concentration $6 \cdot 10^{-2}$ mg/ml:

absorption quickly decreases from 200 to 260 nm , remains almost constant in the range $260-330\text{ nm}$, and then decreases again.

CIDI powder is insoluble in acetone, benzene, chloroform, ethyl ether, petroleum ether, ethyl alcohol, isopropyl alcohol; it is soluble in methanol and water.

The aqueous solution of CIDI has a pH of 6.5.

The LD_{50} on mice Crl: CD-1 (ICR) BR is 1274.9 mg/kg (fiducial limits $1041.2-1561.0\text{ mg/kg}$) orally and 25 mg/kg (fiducial limits $23.0-27.2\text{ mg/kg}$) intraperitoneally.

EXAMPLE 3

Further method of purification of the active principles

10 g of CIDI powder, obtained according to the process of examples 1 and 2, were solubilized in 1000 ml of a solution of ethyl alcohol and water (4:1), obtaining a solution at 1% of a green colour. A chromatograph column with a diameter of 4.5 cm was prepared, provided with a porous separator. On the separator is laid a layer of cotton wool, then a layer

of sand approximately 3 cm high. A suspension containing g 35 of active carbon in ethanol is then poured on. Once the active carbon has packed tightly, the solution of CIDI powder (solubilized as described above) is made to pass through the chromatographic column. Once all the CIDI solution has passed through the chromatographic column, the column is washed by passing 1000 ml of the solvent alone (ethyl alcohol - H₂O 4:1)

A limp, colourless solution is obtained, which is concentrated to its maximum limit in a rotavapor at a temperature of 45°C.

Crystallization takes place after addition of isopropyl alcohol. Once dried, again in a rotavapor, and ground in a mortar, a white powder is obtained, which will hereinafter be indicated as pure CIDI. Pure CIDI corresponds to 60% CIDI by weight.

The pure CIDI powder, solubilized in methanol and examined using the usual HPLC method, shows two main peaks with RT values of 1.131 (87.54% area) and 1.551 (6.16% area).

On the contrary, HPLC with UV detector at 217 nm, movable phase CH₃CN-H₂O (3:1), flow rate 1.5 ml/min gives the following RT (main peaks):

- 1) on Supercosil LC-NH₂-5, μ -spherical column: 1.885 (conc. 19.60); 16.259 (conc. 67.51);
- 2) on Chrompack-Lichrosorb RP18-10, μ -irregular column: 1.617 (conc. 87.74); 1.985 (3.69) and 2.134 (2.20).

Pure CIDI is a white water-soluble solid which has a calcination residue of 3.05%.

The elementary analysis in % by weight (without taking into account the residue) is: C 48.82%, H 7.06%; O 44.12 % with a minimal empirical formula close to C₆H₁₀O₄ and m.p. (dec.) 205-255°C.

The IR spectrum is practically the same as that of the product CIDI.

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UV spectrum (spectrophotometer UV-vis Perkin Elmer mod. Lambda 5):

1) solution in $\text{CH}_3\text{OH}-\text{H}_2\text{O}$ (4:1), concentration $6 \cdot 10^{-2}$ mg/ml:

5 maximum absorption at 203 nm; absorption quickly decreases, practically no absorption is observed above 260nm;

2) solution in $\text{CH}_3\text{CN}-\text{H}_2\text{O}$ (3:1), concentration $6 \cdot 10^{-2}$ mg/ml:

10 absorption quickly decreases from 200 to 260 nm, then remains constant at a level close to zero.

The solubility of pure CIDI is the same as that of CIDI, and also the pH of the aqueous solution is the same.

15 The intraperitoneal LD_{50} of pure CIDI on mice Crl: CD-1 (ICR) BR is 20.2 mg/kg (fiducial limits 17.8-22.0 mg/kg).

NMR spectra of CIDI and pure CIDI:

20 The NMR spectra have been carried out with an apparatus Bruker AC 200 at 200 MH_2 (proton) and 50 MH_2 (carbon). The samples have been prepared by dissolving 90 mg of product into 0.6 ml of $\text{DMSO}-d_6$ with the addition of 10 mg of the sodium salt of 3-(trimethylsilyl) propansulphonic acid (DSS) as internal

25 standard.
For ^1H spectra 1000 transients have been accumulated by using an impulse of 30°; the FID have been subjected to a Gaussian multiplication in order to increase the resolution. The exchange of mobile protons has been carried out by adding $\text{D}_2\text{O} + \text{CF}_3\text{COOH}$.

30 For ^{13}C spectra 6200 transients (CIDI) and 14900 transients (pure CIDI) have been accumulated by using an impulse at 90° with heteronuclear de-coupling in CPD.

35 From the examination of ^1H spectra derives the presence of several mobile protons in the range 3-5 ppm. The presence of a number of protons of alkylic type is noted, the alkylic protons decreasing at lower

ranges. Possible presence of some vinyl proton; and absence of aromatic protons. The ^{13}C spectra confirm the above data, with the presence of a great number of alkylic carbons more or less substituted. The presence of some peaks in the vinyl range and of some peaks in the carbonyl range are noted, the carbonyl groups being of acidic or esteric type.

The spectra examination evidentiates no substantial differences between the two mixtures. A difference in the percentage of the various components would appear to be possible.

EXAMPLE 4

Method for chromatographic separation of the active principles

The alcohol-chloroform solution, obtained according to example 1, is dried out in a rotovapor and resolubilized in a small amount of methanol (100 ml). Using this solution, chromatographic separation is carried out both on a silica-gel column and, with greater care, on an HPLC preparative column. Pure fractions are thus obtained which, as stated above, correspond to the peaks 1.157; 1.545; 1.883; 2.051; 2.273; 2.572 and 2.743.

EXAMPLE 5

Tests to underline the antineoplastic activity both in vitro and in vivo

The substances and/or compositions obtained according to the preceding examples, either soluble or solubilized using surface-active agents (Polisorbato 80 or Geronol)* in water, show marked antineoplastic activity, together with acceptable toxicity levels and an absence of immunosuppressant activity. The notable selective antineoplastic activity on tumoral cells has been demonstrated, at a histological level, both in vitro and in vivo, by evident alterations in the tumoral cells, which appear to increase in volume, conglutinate, show extroversion and fraying of the cell

* Trade-mark

membrane, an extremely vacuolated and frothy cytoplasm with hypochromia of the nuclear chromatin and pallid nucleoles. Proof of the high selectivity possessed by these substances is given by the fact that all the lesions listed above are totally absent from the normal cells made to undergo the same treatment.

In vivo, the antineoplastic activity of the substances mentioned above was tested on Sa 180 of Swiss mouse, generally using a dose ranging from 2 to 25 mg/Kg/die, according to the substance used, given intraperitoneally for 8 consecutive days, starting from the day following that of the transplant. In comparison with an average survival rate of 25.8 days in the control animals, rejection of the tumour was seen in 90% of the treated animals, which are therefor to be considered as definite survivors.

For therapeutic application, the substances according to the present invention, and their salts, compounds or complexes, are preferably used in the form of aqueous solution for intramuscular, endovenous or endocavitary injection.

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CLAIMS

1. Process for obtaining compositions and/or substances having an antineoplastic activity, characterized by the fact that parts and/or products of plants from the family Pittosporaceae - in whatever stage of their development or maturity - are subjected essentially to the following operations:
- a) extraction of components by maceration in an organic solvent;
 - b) optional stirring or shaking of the solution containing the extract with another solvent, at least partially miscible with the first, to distribute the components of the extract among the phases formed;
 - c) optional treatment of each phase, independently from each other, with at least one further organic liquid having the properties of solvent for at least one of the components in the extract, followed by filtering of any suspension which may have formed and dissolution of the solid phase in a suitable solvent;
 - d) optional separation of the components found in each liquid phase; and
 - e) collection of the separated components with antineoplastic activity and those without antineoplastic activity,
- said extracts being optionally dried and purified before each further stage of the process.

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2. Process according to claim 1, in which the plants are of the genus *Pittosporum*.

3. Process according to claim 2, in which the plants
5 are selected from the group comprising *Pittosporum undulatum*,
Pittosporum coriaceum, *Pittosporum viridicolor*, *Pittosporum*
rhombipholium, *Pittosporum eugenoides*, *Pittosporum*
crossifolium and *Pittosporum Tobira*, and combinations thereof.

4. Process according to claim 1, in which the solvent
10 is selected from the group of alcohols.

5. Process according to claim 4, in which the alcohol is ethanol.

6. Process according to claims 1, 2, 3, 4 or 5, in which the ratio by volume of organic solvent and plant parts
15 to be treated is between 1:10 and 10:1.

7. Process according to claim 6, in which the treatment times are between 5 minutes and 3 months.

8. Process according to claims 1, 2, 3, 4, 5, or 7, in which the treatment temperature is comprised between 5°C and
20 100°C.

9. Process according to claims 1, 2, 3, 4, 5, or 7, in which the separation of the extract components is of a chromatographic type.

10. Process according to claim 9, in which separation of
25 the extract components takes place on a silicagel column.

11. Process according to claim 9, in which separation of the extract components takes place on an HPLC preparative column.

12. Process according to claims 1, 2, 3, 4, 5, 7, 10 or 11, in which extraction is performed using ethanol and the components having retention times distributed around the values 1.157, 1.545, 1.883, 2.051, 2.273, 2.572 and 2.743 are separated using the HPLC technique and collected.

13. Process according to claims 1, 2, 3, 4, 5, 7, 10 or 11, in which extraction is performed using ethanol, the solution obtained is shaken with chloroform to form two phases, an alcohol-chloroform phase of an intense green colour and an aqueous phase of a yellow-orange colour, the compounds having antineoplastic activity being present in the intense green phase.

14. Process according to claim 13, in which separation of the components having antineoplastic activity is performed using chromatography after having dried out the alcohol-chloroform phase and resolubilized the solute in methanol.

15. Process according to claim 14, in which separation of the components having antineoplastic activity is performed using the HPLC technique and the components having retention times distributed around the values 1.969, 2.296 and 2.756 are collected.

16. Process according to claim 13, in which the alcohol-chloroform solution is evaporated until reduced to approximately 1/35 by volume of the volume of the initial alcohol solution, and isopropyl alcohol is added to form a suspension which is filtered, said solid phase being heat dried and ground, obtaining a greenish powder.

17. Process according to claim 16, in which the solid phase, solubilized in ethyl alcohol-water (4:1), is passed through a chromatographic column of active carbon, obtaining a
5 limpid, colourless solution, which, when concentrated, is crystallized by addition of isopropyl alcohol and then dried out, obtaining a white powder, which under HPLC shows two main peaks with RT values of 1.131 (87.54% area) and 1.551 (6.16% area).

10 18. Process according to claims 16 or 17, in which the components of the solid dissolved in methanol are separated using the HPLC technique, collecting the components having retention times distributed around the values 1.157, 1.545 and 2.264.

15 19. Substances and compositions, characterized in that they are obtainable using the process according to claims 1, 2, 3, 4, 5, 7, 10, 11, 14, 15, 16, or 17.

20 20. Substances and compositions having antineoplastic activity, characterized in that they are obtainable using the process according to claims 1, 2, 3, 4, 5, 7, 10, 11, 14, 15, 16, or 17.

25 21. Substances and compositions having antineoplastic activity according to claim 20, in a form selected from the group comprising salts, compounds, complexes and combinations thereof, in order to make them soluble in water.

22. Pharmaceutical preparation, characterized by the fact that it contains, as at least one of its active principles, substances and compositions selected from the group of products having antineoplastic activity which are

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obtainable from the process according to claims 1, 2, 3, 4, 5, 7, 10, 11, 14, 15, 16 or 17.

23. Pharmaceutical preparation according to claim 22,
5 prepared in the form of an aqueous solution for parenteral use.

24. Pharmaceutical preparation according to claim 22,
prepared in the form of capsules for oral use.

25. Pharmaceutical preparation according to claim 22,
10 prepared in the form of suppositories for rectal use.

26. Pharmaceutical preparation according to claim 22,
prepared in the form of ovules for use in the vagina.

27. Pharmaceutical preparation according to claim 22,
prepared in the form of an unguent, salve, creme or gel.

15 28. Pharmaceutical preparation according to claim 23,
prepared in fials, each fial containing between 0.1 and 2.5 g
of active principle.

29. Pharmaceutical preparation according to claim 28, in
which each fial contains preferably between 0.1 and 1.5 g,
20 more preferably between 0.2 and 1.0 g of active principle.

30. Pharmaceutical preparation according to claim 24,
prepared in the form of capsules, each capsule containing
between 0.1 and 2.0 g of active principle.

31. Pharmaceutical preparation according to claim 30, in
25 which each capsule contains from 0.8 to 1.2 g of active
principle.

32. Pharmaceutical preparation according to claim 25,
prepared in the form of suppositories for rectal use, each

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suppository containing between 0.2 and 2.5 g of active principle.

33. Pharmaceutical preparation according to claim 32, in
5 which each suppository contains between 0.3 and 1.0 g, or
between 1.2 and 1.7 g of active principle.

34. Pharmaceutical preparation according to claim 26,
prepared in the form of ovules for use in the vagina, each
ovule containing between 0.1 and 2.5 g of active principle.

10 35. Pharmaceutical preparation according to claim 34, in
which each ovule contains preferably between 0.5 and 2.5 g,
more preferably between 0.3 and 1.7 g of active principle.

36. Pharmaceutical preparation according to claim 27,
prepared in the form of an unguent, salve, creme or gel, with
15 an excipient for topical use containing between 0.5 and 12% of
active principle.

37. Pharmaceutical preparation according to claim 36, in
which the excipient for topical use contains between 3 and 7%
by weight of active principle.

20 38. Use of the components obtainable by means of the
process according to claims 1, 2, 3, 4, 5, 7, 10, 11, 14, 15,
16 or 17 - either alone or in combination - for the
preparation of drugs for the treatment of pathologies other
than neoplastic ones.

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